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CNC CHARLESTON
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LETTER REGARDING SOUTH CAROLINA DEPARTMENT OF HEALTH AND
ENVIRONMENTAL CONTROL APPROVAL OF WELL INSTALLATION FOR SITE #17624 CNC
CHARLESTON SC
07/17/1997
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL



2600 Bull Street
Columbia, SC 29201-1708

WFO comment
7.16.98
Lo B. 17 98

Monitoring Well Installation Approval Form

Date of Issue: July 17, 1997

Approval No: 8563

Approval is hereby granted to: Department of the Navy
(on behalf of): Charleston Naval Complex/Naval Base
Site Identification #: 17624
County: Charleston

This approval is for the construction of seven (7) temporary monitoring wells designated (no designation) in accordance with the construction plans and technical specifications submitted to the Department on May 19, 1997. The temporary monitoring wells are to be constructed within the surficial aquifer for the intended purpose of monitoring groundwater quality and/or water level(s) at the referenced facility. Approval is provided with the following conditions:

1. The latitude and longitude, surveyed elevations, boring and/or geologist logs and actual (as built) construction details for each well be submitted to Paul L. Bristol within thirty (30) days of completion (of last well(s) installed). (to be submitted with the Final Assessment Report)
2. Each well shall be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well I.D.#, date of construction, static water level, and driller name and state certification #. (waived)
3. Well construction and sampling derived waste including, but not necessarily limited to, drill cuttings, drilling fluids, development and purge water should be managed properly and in compliance with applicable requirements. If containerized, each vessel should be clearly labeled with regard to contents, source, and date of activity.
4. A minimum of forty-eight (48) hours prior to initiation of drilling activities, please provide notice to Ms. Christine Sanford-Coker, Trident District EQC Office (803-740-1590).
5. Please provide ground-water quality analytical data (chemical analysis and/or water level(s)) associated measurements (i.e., in-situ field measurements) to Paul L. Bristol within thirty (30) days of receipt from laboratory. (to be submitted with the Final Assessment Report)
6. Monitoring wells shall be installed by a well driller certified by the State of South Carolina.

This approval is pursuant to the provisions of Section 44-55-40 of the 1976 South Carolina Code of Laws and the Department of Health and Environmental Control Regulations R.61-71.

RECEIVED

JUL 16 1998

Approved by:


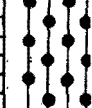
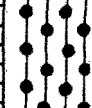



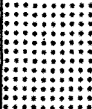
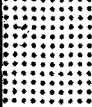

Paul L. Bristol, Hydrogeologist, P.G.
Groundwater Assessment & Development Section
Bureau of Water

Water Monitoring Assessment &
Trident District EQC
Protection Division

Water Well Record

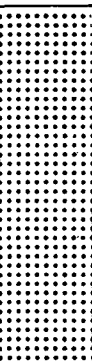

COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

DRILLING LOG		DIVISION SOUTH ATLANTIC	INSTALLATION FORMER CHARLESTON NAVAL BASE	SHEET 1 OF 2 SHEETS
1. PROJECT INSTALLATION OF TEMPORARY MONITORING WELLS AT BUILDING 200 FORMER US SITE			10. SIZE AND TYPE OF BIT 4 1/4" ID HSA, 1 3/8" SPLITSPOON	
2. LOCATION (Coordinates or Station) SEE REMARKS COLUMN (9)			11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY CHARLESTON ENVIRONMENTAL DETACHMENT			12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO 2400 SR-1	
4. HOLE NO. (As shown on drawing title and file number) NBCT-200-TW-02			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 2 UNDISTURBED NONE
5. NAME OF DRILLER			14. TOTAL NUMBER CORE BOXES NONE	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER NOT DETERMINED	
7. THICKNESS OF OVERBURDEN > 15.0'			16. DATE HOLE STARTED 17 JUN 98 COMPLETED 17 JUN 98	
8. DEPTH DRILLED INTO ROCK N/A			17. ELEVATION TOP OF HOLE NOT DETERMINED	
9. TOTAL DEPTH OF HOLE 15.0'			18. TOTAL CORE RECOVERY FOR BORING N/A %	
			19. SIGNATURE OF INSPECTOR James A. Biddle GEOLOGIST	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.45		ASPHALT			WATER LEVEL DURING DRILLING NOT DETERMINED
	2'		(SM) LIGHT BROWN AND BROWN, FINE TO MEDIUM SILTY SAND WITH A TRACE OF FINE GRAVEL.			WATER LEVEL @ 2 HOURS 6.63' IN WELL CASING
	4'		FINE, NO GRAVEL			
	4.2'		YELLOWISH-BROWN, W/A TRACE OF COARSE			
	5.3		(OL) DARK BROWN, BLACK CLAYEY ORGANIC SILT		TW 02-1 (4') SAMPLE	ACTUAL SAMPLE DEPTH 3.5'-5.5'
	6'		(CL) YELLOWISH-BROWN AND MEDIUM GRAY SANDY, LEAN CLAY WITH 10-15% SILT			N
	8'		(SP) GRAY, FINE TO MEDIUM, POORLY GRADED SAND WITH MINOR SHELL CONTENT			BLDG 200
	9'		(CL) YELLOWISH-BROWN, SILTY/SANDY LEAN CLAY, VERY LOW PLASTICITY		TW 02-2 (8') SAMPLE	NOTE: CHANGES OF MATERIAL DEPTHS ARE APPROXIMATE AND DETERMINED FROM AUGER CUTTINGS AND SOIL REMAINING ON AUGER ON REMOVAL FROM BORINGS EXCEPT AT SPLITSPOON SAMPLE DEPTHS.
	10'		(SP) GRAY, FINE TO COARSE, POORLY GRADED SAND WITH 20% SHELL CONTENT, FIRST INDICATION OF WATER.			

CONTINUED ON SHEET NO. 2

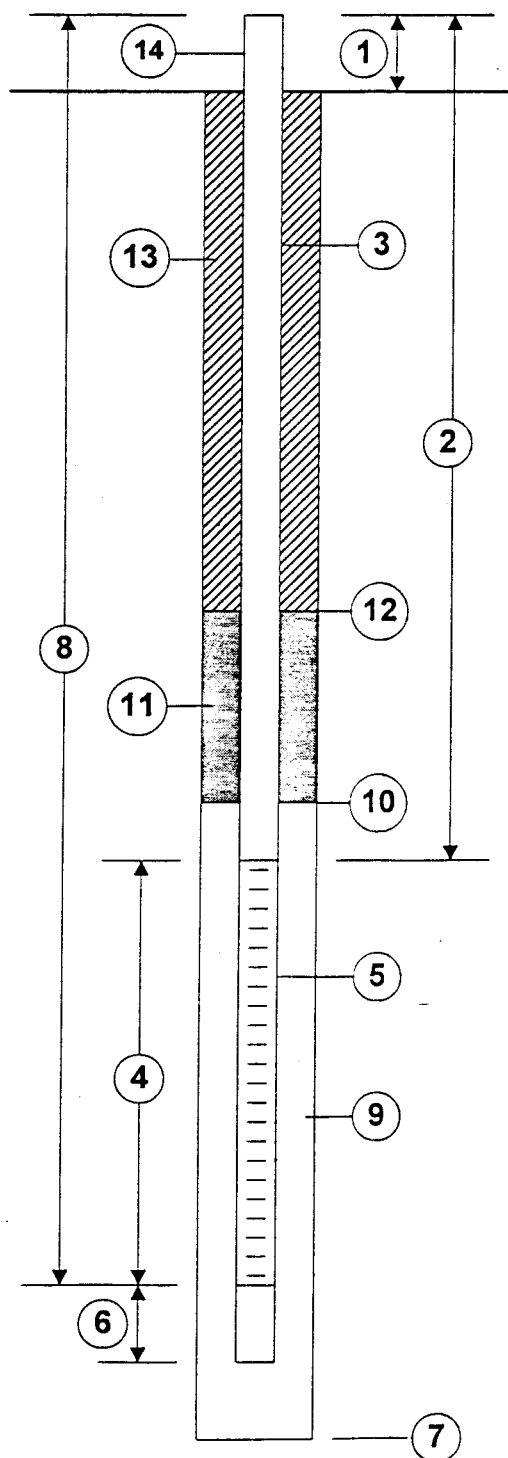
NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

DRILLING LOG (Cont Sheet)			ELEVATION TOP OF HOLE NOT DETERMINED		Hole No. NBCT-200-TW-02		
PROJECT INSTALLATION OF TEMPORARY MONITORING WELLS AT BLDG. 200 FORMER UST SITE			INSTALLATION FORMER CHARLESTON NAVAL BASE			SHEET 2 OF 2 SHEETS	
ELEVATION a	DEPTH 10' b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	
	12'		(SP) CONTINUED FROM SHEET No 1				
	14'		(CL) YELLOWISH-BROWN AND GRAY SANDY/SILTY LEAN CLAY, TRACE OF FINE GRAVEL				
	15'		BORING TERMINATED AT 15.0'				

WELL CONSTRUCTION DETAILS

FORMER CHARLESTON NAVAL BASE BUILDING 200 FORMER UST SITE INVESTIGATION

WELL NUMBER NBCT-200-TW-02
 DATE OF INSTALLATION 06/17/98
 INSTALLED BY CHARLESTON ENVIRONMENTAL
 DET. TANKSCT / J. BIDDLE



1. Height of Casing above ground 1.85'
2. Total length of Riser pipe 6.65'
2" ID SCHEDULE 40
FLUSH THREAD PVL.
3. Type of Riser pipe FLUSH THREAD PVL.
4. Length of Screen 10.0'
2" ID SCHEDULE 40 PVL. FLUSH
THREAD. 0.010" SLOT SIZE
5. Type of Screen 0.5' (0.3' UNSLOTTED
PORTION OF SCREEN)
6. Length of Sump PORTION OF SCREEN)
7. Depth of Boring 15.0'
Diameter of Boring 7.75" NOMINAL
8. Depth to Bottom of Screen 14.8'
"DRILLERS SERVICES"
9. Type of filter pack NO. 2 FILTER PACK SAND
Quantity Used 325 Lbs.
Size 10-30 SCREEN SIZE
10. Depth to Top of Filter Pack 2.5'
"SHUR PEL" 1/2" BENTONITE
11. Type of Seal PELLETS
Quantity Used 75 Lbs.
12. Depth to Top of Seal 0.6'
13. Type of Grout NONE
Grout Mixture N/A
Method of Placement N/A
14. Type of Well Protection NONE AT THIS TIME
Concrete Cap to be poured to Asphalt
Surface.

COMMENTS:

Water level at 2 Hours: 6.63' bgs.
 Secured w/ Locking Well Cap.

jb 6/18/98

Water Well Record

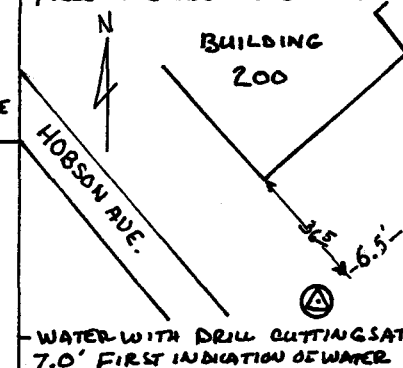
COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)




DRILLING LOG		DIVISION SOUTH ATLANTIC	INSTALLATION CHARLESTON NAVAL BASE (FORMER)	SHEET 1 OF 2 SHEETS
1. PROJECT INSTALLATION OF MONITORING WELLS AT BUILDING 200, FORMER LST SITE			10. SIZE AND TYPE OF BIT 4 1/2" ID HOLLOW STEM AUGER, 1 3/8"	
2. LOCATION (Coordinates or Station) SEE REMARKS COLUMN (g)			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) ID SPLITSPAWN	
3. DRILLING AGENCY CHARLESTON ENVIRONMENTAL DETACHMENT TANK SECT.			12. MANUFACTURER'S DESIGNATION OF DRILL SIM CO 2400 SR-1	
4. HOLE NO. (As shown on drawing title and file number) NBCT-200-TW-03			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 2
5. NAME OF DRILLER			UNDISTURBED NONE	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.			14. TOTAL NUMBER CORE BOXES NONE	
7. THICKNESS OF OVERBURDEN > 17.0'			15. ELEVATION GROUND WATER NOT DETERMINED	
8. DEPTH DRILLED INTO ROCK N/A			16. DATE HOLE STARTED 17 JUN 98 COMPLETED 17 JUN 98	
9. TOTAL DEPTH OF HOLE 17.0'			17. ELEVATION TOP OF HOLE NOT DETERMINED	
			18. TOTAL CORE RECOVERY FOR BORING N/A %	
			19. SIGNATURE OF INSPECTOR James O. Bidder GEOLOGIST	

ELEVATION a	DEPTH 0' b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	2'		(SM) BROWN, FINE SILTY SAND LIGHT BROWN			WATER LEVEL DURING DRILLING: 7.0'
						WATER LEVEL AFTER 1 HOUR 6.42'
						NOTE: EXCEPT FOR SPLITSPOON SAMPLE INTERVALS, DEPTHS FOR CHANGE OF MATERIALS ARE APPROXIMATIONS BASED ON SOIL CUTTINGS AND SON ON AUGER OR WITH DRAWAL
	4'		DARK BROWN, ORGANIC TEXTURE, APPEARANCE			FIRST PUSH DID NOT PRODUCE SAMPLE. ONE 2" DIAMETER PIECE OF GRAVEL LOGGED IN SHAPE.
	4.6'		(SP) LIGHT BROWN AND YELLOW-ORANGE F. POORLY GRADED SAND WITH 15% SILT		TW 03-1 (4') SAMPLE	
	5.7'		(SC) MEDIUM GRAYISH-BROWN, FINE CLAYEY SAND			
	6'		(SP) MEDIUM BROWN, FINE TO MEDIUM GRAINED, POORLY GRADED SAND			
	8'		(SC) DARK GREENISH-BROWN, FINE TO MEDIUM CLAYEY SAND		TW 03-2 (8') SAMPLE	
	10'					
	12'					

CONTINUED ON SHEET NO. 2

NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.



DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE NOT DETERMINED		Hole No. NBCT-200-TW-03		
PROJECT INSTALLATION OF MONITORING WELLS AT BUILDING 200 FORMER U ST SITE			INSTALLATION FORMER CHARLESTON NAVAL BASE		SHEET 2 OF 2 SHEETS	
ELEVATION a	DEPTH 12' b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV. ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(SC) CONTINUED FROM SHEET NO. 1			STRONG HYDROGEN SULFIDE ODOR
	14		(OL/OH) DARK GRAY, HIGH LIQUID LIMIT ORGANIC SILT, SEMI-PLASTIC			
	16		(OH) DARK GRAY, HIGH LIQUID LIMIT ORGANIC CLAY, PLASTIC			
	17'		BORING TERMINATED AT 7.0'.			

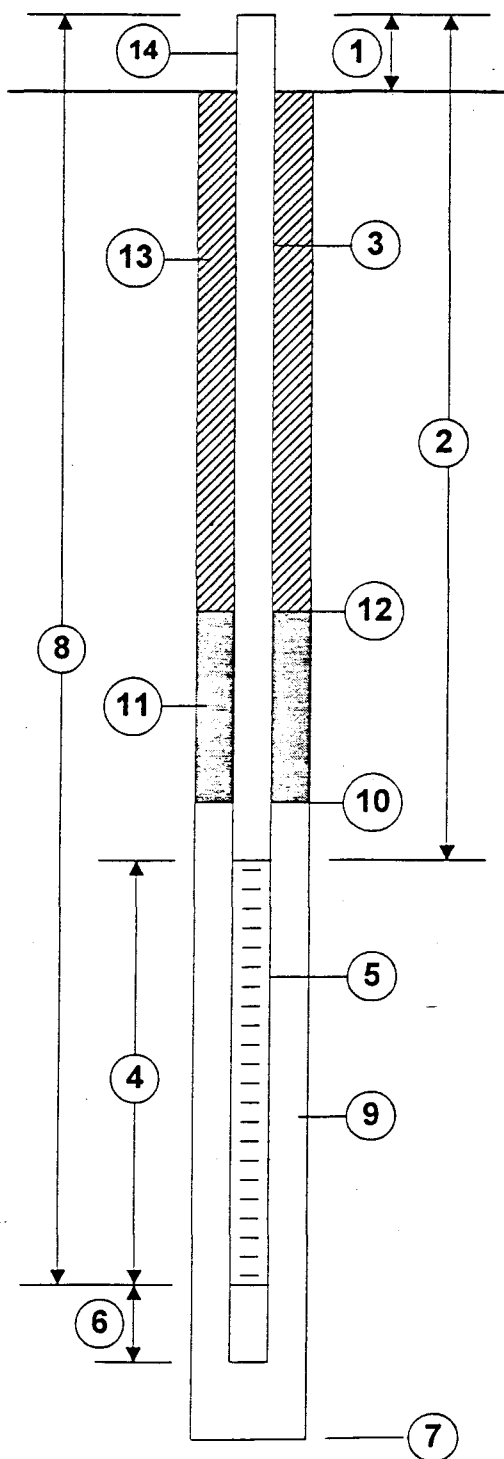
WELL CONSTRUCTION DETAILS

FORMER CHARLESTON NAVAL BASE BUILDING 200 FORMER LIST SITE INVESTIGATION

WELL NUMBER NBCT-200-TV-03

DATE OF INSTALLATION 06/17/98

INSTALLED BY CHARLES SEW ENVIRONMENTAL
DETACHMENT TANK SECTION / J. BIDDLE



1. Height of Casing above ground 1.40'
2. Total length of Riser pipe 5.9'
2" ID SCHEDULE 40 FLUSH
3. Type of Riser pipe THREAD PVC
4. Length of Screen 10.0'
2" ID SCHEDULE 40 PVC
5. Type of Screen 0.010" SLOTTED
0.5' (INCLUDES 0.3' LIN SLOTTED
6. Length of Sump PORTION OF SCREEN
7. Depth of Boring 17.0'
Diameter of Boring 7.75" NOMINAL
8. Depth to Bottom of Screen 14.5'
"DRILLERS SERVICES" No. 2
9. Type of filter pack FILTER SAND.
Quantity Used 400 LBS
Size 10-30 SCREEN SIZE
10. Depth to Top of Filter Pack 2.1'
"SHUR SEAL" 1/2" BENTONITE
11. Type of Seal PELLETS
Quantity Used 60 LBS.
12. Depth to Top of Seal 0.5'
13. Type of Grout NONE
Grout Mixture N/A
Method of Placement N/A
14. Type of Well Protection NONE AT THIS TIME

COMMENTS:

WATER LEVEL, 1 HOUR AFTER INSTALLATION:
6.42'.

jb 6/18/98

Water Well Record

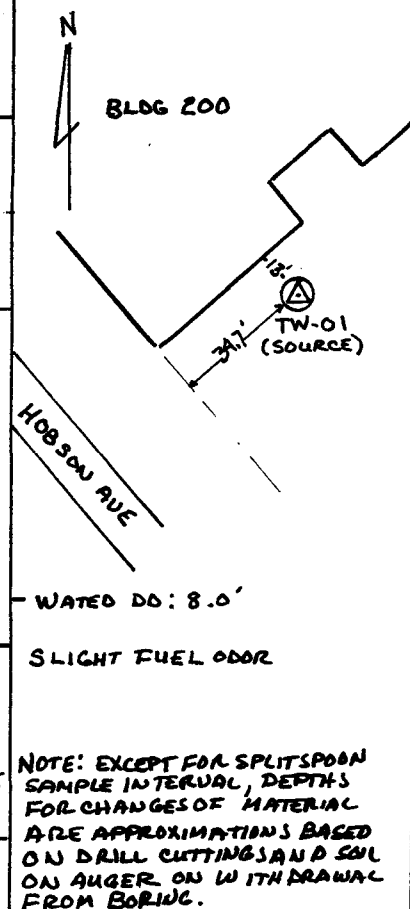
COPY 1 MAIL TO: S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (ADDRESS ABOVE)

DRILLING LOG		DIVISION SOUTH ATLANTIC (USACE)	INSTALLATION FORMER CHARLESTON NAVAL BASE	SHEET 1 OF 2 SHEETS
1. PROJECT INSTALLATION OF TEMPORARY MONITORING WELLS AT BUILDING 200 FORMER UST SITE			10. SIZE AND TYPE OF BIT 4" ID HOLLOW STEM AUGER, 1 3/8"	
2. LOCATION (Coordinates or Station) SEE REMARKS COLUMN (9)			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) ID SPLIT SPOON	
3. DRILLING AGENCY CHARLESTON ENVIRONMENTAL DETACHMENT (TANK SEC)			12. MANUFACTURER'S DESIGNATION OF DRILL SIMCO 2400-SR-1	
4. HOLE NO. (As shown on drawing title and file number) NBCT-200-TW-01			13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 2
5. NAME OF DRILLER			UNDISTURBED NONE	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.			14. TOTAL NUMBER CORE BOXES NO	
7. THICKNESS OF OVERBURDEN > 17.0'			15. ELEVATION GROUND WATER NOT DETERMINED	
8. DEPTH DRILLED INTO ROCK N/A			16. DATE HOLE STARTED 17 JUN 98 COMPLETED 17 JUN 98	
9. TOTAL DEPTH OF HOLE 17.0'			17. ELEVATION TOP OF HOLE NOT DETERMINED	
			18. TOTAL CORE RECOVERY FOR BORING N/A %	
			19. SIGNATURE OF INSPECTOR James A Biddle GEOLOGIST	

ELEVATION a	DEPTH 0' b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.35'		ASPHALT			WATER LEVEL @ 8.0' DURING DRILLING.
	2'		(SM) DARK BROWN, FINE, SILTY SAND WITH ORGANIC TEXTURE AND APPEARANCE			WATER LEVEL @ 7.00' AFTER 2 HOURS. (IN WELL CASING)
	3.05'		(SP) DARK GRAY, FINE, POORLY GRADED SAND WITH 10% SILT			NOTE: AT 1.0' PID READS 1 PPM.
	3.6'		(CL) LIGHT BROWN, SANDY LEAN CLAY, FINE SAND FRACTION 15%.			
	4'		W/ TRACES OF MEDIUM AND COARSE SAND		TW 01-1 (4')	
	6'					
	8'					
	10'		(SP) GRAY, FINE TO MEDIUM, POORLY GRADED SAND WITH 15% SILT, SHELL FRAGMENTS, SATURATED			
	10.5'		(OL/OH) DARK BROWNISH-GRAY, HIGH LIQUID LIMIT ORGANIC SILT/CLAY, MEDIUM PLASTICITY		TW 01-2 (8') SAMPLE	
	12.0'					

CONTINUED ON SHEET No. 2

NOTE: SOILS VISUALLY FIELD CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.



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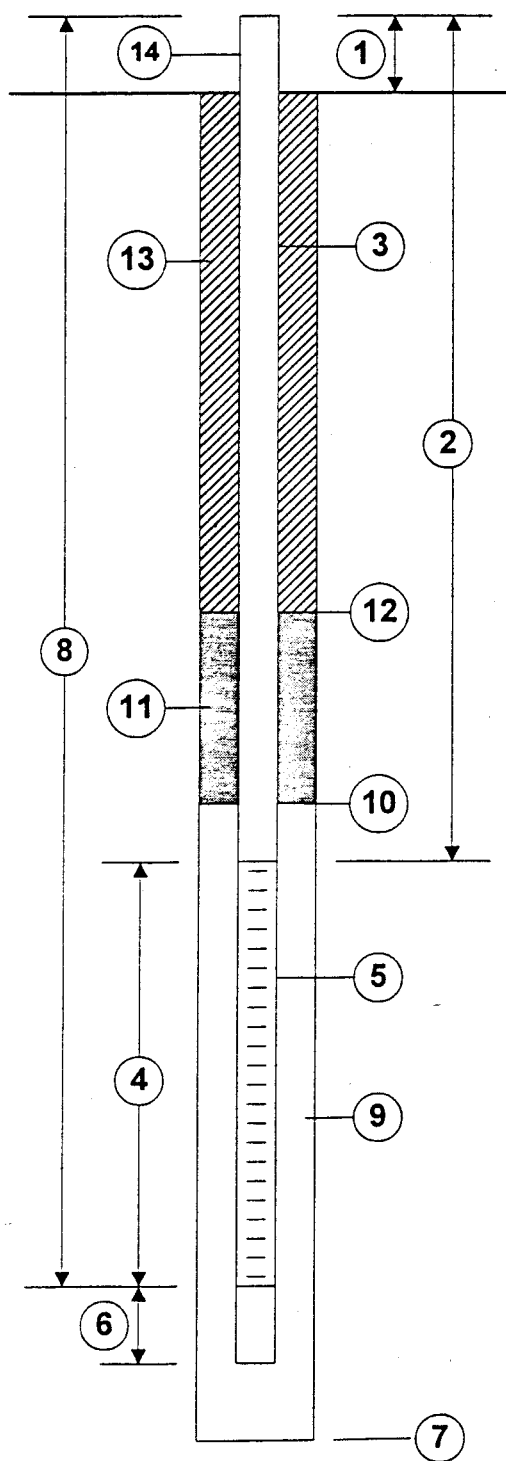
WELL CONSTRUCTION DETAILS

FORMER CHARLESTON NAVAL BASE BUILDING 200 FORMER UST INVESTIGATION

WELL NUMBER NBCT-200-TW-01

DATE OF INSTALLATION 06/17/98

INSTALLED BY CHARLESTON ENVIRONMENTAL DET.
TANK SECTION / J. BIDDLE



1. Height of Casing above ground 2.58'
2. Total length of Riser pipe 7.68'
3. Type of Riser pipe 2" ID SCHEDULE 40
FLUSH THREAD PVC
4. Length of Screen 10.0'
5. Type of Screen 2" ID SCHEDULE 40
FLUSH THREAD PVC. 0.010" SLOT
0.5' (INCLUDES 0.3' UNSLOTTED
PORTION OF SCREEN.
6. Length of Sump PORTION OF SCREEN.
7. Depth of Boring 17.0'
Diameter of Boring 7.75" NOMINAL
8. Depth to Bottom of Screen 15.1'
"DRILLERS SERVICES" NO. 2
9. Type of filter pack FILTER SAND
Quantity Used 375 Lbs
Size 10-30 SCREEN SIZE
10. Depth to Top of Filter Pack 3.0'
"SHUR SEAL" 1/2" BENTONITE
11. Type of Seal PELLETS
Quantity Used 75 Lbs.
12. Depth to Top of Seal 0.4'
13. Type of Grout NONE
Grout Mixture N/A
Method of Placement N/A
14. Type of Well Protection NONE AT INSTALLATION
CONCRETE CAP TO BE POURED TO ASPHALT SURFACE.

COMMENTS:

Water Level 7.00' bgs @ 2 hours
after well installation.

Secured with Locking well cap.

j b 6/18/98